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Impact of Demonstrations on Improving Production and Income from Groundnut in Farmers' Field of Purulia District of West Bengal

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Abstract

Groundnut (Arachishypogaea) is an oilseed crop grown in West Bengal, India. These nuts are used as oil crops and grain legume crops. Most of the farmers cultivate the traditional and age-old varieties. As a result, the production and productivity are relatively low when compared with that of the recently cultivated varieties. In West Bengal conditions, TG51 and TAG24 varieties are found suitable for small farmers. The present study was carried out in Purulia district of West Bengal. Total twenty-five (25)demonstrations was carried out in the farmers' field as per the guidelines of All India Coordinated Research Project (ICAR-AICRP). The demonstrations were carried out duringthe 4 months of *kharif* season (July-October) in the year 2019. The collected data was tabulated and analyzed on the basis of range, mean and percentage Gaps at different percentage have been observed in different management practices like seed rate, seed treatment, fertilizer management and insecticide application.Farmers were motivated to follow new seed varieties and improved management practices.In demonstration fields, gross return increased by 48.80% and net return increased by 53.79% over the farmers' fields. There was a 7.24% increase in benefit cost ratio. It is necessary to motivate farmers to adopt new technologies for future cultivation and this, in turn, would help to develop the socio- economic status of the farmers of this area.

Keywords: Groundnuts, demonstration, management, yield increase, net return

1. Introduction

Groundnut (*Arachishypogaea*) is an oilseed crop found throughout the world for its economic and nutritional importanceIt is consideredto be the poor man's cashew and has been widely accepted for replacing expensive nuts such as almonds, cashews and pistachio as an urban snack. Groundnut is an important edible oilseed crop. These nuts are used as oil crops and grain legume crops. One can get good cash return and is widely grown in all tropical and subtropical regions of the world for its food value, oil and high protein content. About 80% of the world groundnut production comes from seasonally rain fed areas (Gibbons, 1980). Ground nuts are grown during warm season. They need abundant sunshine and warm climate to thrive. The plant requires adequate moistures during its growing seasons and also distinctive dry seasons during pod ripening and maturity. They are adaptable to a wide range of climatic conditions.Challinor et al. (2009a) showed that increased accumulated thermal time in Indian groundnut can completely offset the negative effects of climate change. Indiaoccupies second rank in the world, in respect of area (69.52 million ha), production (56.17 Mt.) and productivity (808 kg ha^{-1}) of groundnut. Banla et al. (2018) opined that groundnut yield has been steadily decreasing for decades as a result of lack of organized breeding program to address production constraints. Disease, insects, and drought are the widespread constraints of groundnut production (Banla et al., 2018). Crop dependency has made producers vulnerable to losses because of the lower prices paid for the pods and kernels (Nautiyal, 2002). Groundnut production in Tanzania is affected by a multitude of biotic and abiotic stresses and socioeconomic constraints.(Happy et al., 2018). Kalyan et al. (2011) told that the non-availability of improved seeds, insufficient extension activities, non-availability of gypsum and fertilizers (manures, inorganic fertilizers and micronutrients) are the problems faced by the farmers.

In West Bengal, like other part of India, groundnut is cultivated both in *kharif* and *rabi*. It has been observed that farmers are still cultivating thedeshi and age-old varieties. As a result, the production and productivity are relatively low when compared with that of the recently cultivated varieties. Many groundnut varieties are being developed by research stations addressing the technology gap that fills both the market and consumption demand. Butthere is a lacuna to introduce those

varieties coupled with improved technologies to all ground nut growing areas. In West Bengal conditions TG51 and TAG24 varieties are found to be most suitable for small farmers over the existing cultivated varieties, i.e. TMV2, AK-12-24. The new varietiesoffer an opportunity for the farmers to get more income as compared to existing varieties. With a view to introduce the new varieties with improved technologies in the Red and Laterite zone of West Bengal, and to convince the farmers for adoption of improved production technologies in groundnut crop, Mohanpur Centre of Bidhan Chandra Krishi Viswavidyalaya has organized demonstration programme in farmers' fields of different districts in West Bengal under the All India Coordinated Research Project on Ground nut.

2. Materials and Methods

The present study was carried out in the Purulia district of West Bengal, India where demonstrations were conducted in 2019. Block Hura in the district was purposively selected as the farmers in this block have been growing ground nut for several years. Four villages namely Banbahal, Natundi, Latulia and Jambad were considered for twenty-five (25) field demonstrations to encourage interested farmers to adopt the new varieties and practices.

A total of 25 demonstrations were conducted in the months of kharof season (July-October) in 2019 involving 25 farmers. The demonstrations were conducted as per AICRP guidelines. Each demonstration was conducted in 0.4 ha (one acre). Prior to conducting demonstrations, a group meeting was held and a general concept was given to the selected farmers regarding the practices of groundnut crop. The farmers selected for the study remained the same before and afterthe demonstrations. The data was collected via personal interviews. The collected data was tabulated and analyzed on the basis of range, mean and percentage. Along with the varietal introduction the whole package of improved management practices was also demonstrated as presented in Table 1. The economic-parameters (gross return, net return and B:C ratio) were worked out on the basis of prevailing market prices of inputs and minimum support prices of outputs. The yield data was recorded from demonstration fields and farmers' fields as check plots.

Table 1: Technology demonstrated in demonstration fields during *kharif* 2019

Sl. No.	Particulars	Demonstrationwith improved technologies	Farmers' practice	Gap
1.	Farming situation	Rainfed	Rainfed	No gap
2.	Variety	TG51 & TAG24	TMV2, AK-12-24	50%
3.	Time of sowing	Mid-June to July	Mid -June to July	No gap
4.	Seed rate	50 kg	40 kg	20%
5.	Seed treatment	SAAF (Carbendazim & Mancozeb) @ 3 g and 2 g kg^{-1}	Nil	100%
6.	Fertilizer (20:60:40 kg ha^{-1} of N: P_2O_5 : K_2O)	Urea -18 kg	Urea-10 kg	45%
		SSP- 150 kg	SSP-25 kg	83%
		MOP-26 kg	MOP-10 kg	62%
	Gypsum	160 kg	Nil	100%
7.	Chlorpyriphos for insect control	3 ml l^{-1}	Nil	100%

3. Results and Discussion

3.1. Demonstration field v/s farmers' practice

The gap between the existing and recommended technologies of groundnut in Purulia district was presented in (Table 1). A full gap was observed in the case of plant protection measures like seed treatment and application of Chlorpyriphos for insect control, and a 50% gap was observed in the case of varieties.An average 64% gap was observed in fertilizer management was definitely the reason of not achieving satisfied yield. Shivran et al. (2020) also observed full gap in the components viz; improved varieties, seed treatment, seed inoculation, fertilizer dose and weed management practices. Whereas, partial gap was observed for the components viz; spacing, irrigation and plant protection measures in chick pea cultivation. Lina et al. (2019) also suggested that to meet the total nutritional needs under intensive cropping systems an integrated supply of nutrients from fertilizers and organic manures seemsto be a need of time. Kumari et al. (2019) also opined that the observed technology gap may be attributed to dissimilarity in soil fertility status and weather conditions. Farmers were not aware about recommended technologies like application of Gypsum for better root and fruit growth. In general, farmers used local or age old varieties instead of the recommended high yielding and disease resistant varieties.

3.2. Economic comparison

The benefits of groundnut cultivation through demonstrated methods over the framers' practices have been calculated and showed in Table 2. It has been found that the average

Table 2: Benefits details of demonstration field and farmers' field and its comparison, n=25

Sl. No.	Particulars	Demonstration with improved technologies		Farmers' practice		% increase in IT over FP
		Range	Mean	Range	Mean	
1.	Pod yield (kg ha^{-1})	2237–1807	2032	1496–1235	1365	48.84
2.	Haulm yield (kg ha^{-1})	2561–2242	2413	1848–1519	1691	42.92
3.	Cost of cultivation (₹ ha^{-1})	25025	25025	16815–18605	18032	38.78
4.	Gross return (₹ ha^{-1})	72280–89480	80842	49840–59840	54326	48.80
5.	Net return (₹ ha^{-1})	47255–64455	55817	31605–39875	36294	53.79
6.	BCR	2.89–3.58	3.23	2.74–3.33	3.01	7.24

pod yield was 2032 kg ha^{-1} in the demonstration fields and 1365 kg ha^{-1} in the farmers' fields. It indicates that there was a 48.84% increase in yield in the demonstration fields in comparison to the farmers' fields. Again, calculating the haulm yield it has been found that there was 48.84% increase in the demonstration fields compared to the farmers' fields. Average cost of cultivation per hectare was 38.78% more in the demonstration fields as compared to the farmers' fields. This was due to the use of more inputs management for higher yield. As a result of higher yield in demonstration fields, the gross return as well as net return was more in the case of demonstration fields as compared to farmers' fields. Gross return increased by 48.80% and net return increased by 53.79% in the demonstration fields. The BCR in farmers' fields was 3.01, whereas that the in demonstration fields was 3.23. There was also a 7.24% increase in benefit cost ratio. Thus, it has been found that a higher income can be made through more yield, and better market return if farmers apply the improved technologies and management practices as done in the demonstration fields.

4. Conclusion

Demonstration field had given 48.84% more yield and 53.79% higher economic return over farmer's field. With the initiative of demonstration activities under AICRP on groundnut, farmers were motivated to adopt the new cultivation proceduresin their groundnut fields to get higher yield, more returns and more income as well.

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